

NASA TECH BRIEF



This NASA Tech Brief is issued by the Technology Utilization Division to acquaint industry with the technical content of an innovation derived from the NASA space program.

Stringent Cleaning Technique Assures Reliable Epoxy Bond

The problem: Routine cleaning methods used in bonding aluminum load-bearing members have resulted in bond failures in the presence of vibrational and torsional forces.

The solution: A careful cleaning, etching, rinsing, and drying of mating surfaces to be bonded. A rigid assembly is then made using an epoxy and hardener designed for metal-to-metal bonding.

How it's done: Extruded aluminum tube sections and couplings are thoroughly degreased with a 50/50 solvent solution of methymethylketone (MEK) and clorothene. All mating surfaces are carefully scoured with a mildly abrasive cleaner and rinsed in a de-ionized water bath. Items are wiped dry with soft toweling and immediately cold-etched for 20 minutes in the following mixture:

Sodium dichromate:	2 parts by weight
96 percent sulphuric acid:	7 parts by weight
De-ionized or distilled water:	17 parts by weight

The cold etch is followed immediately by a thorough rinsing in a spray bath of de-ionized water. All traces of the etch solution are removed and the surfaces checked with ion test paper to ensure a completely neutral condition. The parts are then force dried at a temperature of 158°F for 30 minutes in a clean, circulating-hot-air-type oven. Immediately following

the drying process, the adhesive mix is applied to both mating surfaces and the units pressed firmly together in bonding fixtures. Excess adhesive is carefully removed with a plastic spatula. The units are kept in the bonding fixtures for the duration of the curing cycle recommended by the adhesive manufacturer.

Notes:

1. This cleaning technique for preparing aluminum surfaces for adhesive bonding is recommended wherever high-strength aluminum-to-aluminum bonds are required.
2. For further information about this innovation inquiries may be directed to:
Technology Utilization Officer
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Reference: B64-10142

Patent status: NASA encourages commercial use of this innovation. No patent action is contemplated.

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